



Data Sheet

Moving Coil Meter DC Ammeters And Voltmeters 240⁰

PL



Measure



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Application

The moving coil panel meters, PL 48/72/96/144 housed in moulded polycarbonate cases are suitable for the measurement of DC currents and voltages.

These instruments offer several advantages in switchboards and Generating Set Panels. Number of meters can be mounted in a single Cut out (Mosaic mounting). Front glass, Bezel & Dial can be easily replaced.

Features

- Better resolution.
- Linear Scale.
- Glass filled polycarbonate housing (UL 94-V-0).
- Knife edge pointer.
- Easily replaceable glass and bezel.
- Easy installation with swivel screws.

Movement

Moving coil movement has pivots of very high hardness. Movement is suspended between spring loaded sapphire jewels. Movement is properly shielded & critically damped by eddy currents induced in coil former.

Specifications

Scale and Pointer

Pointer	:	Knife - edge pointer
Pointer deflection	:	0 ... 240°
Scale characteristics	:	Linear
Scale division	:	Coarse - fine
Scale length	:	PL 48 PL 72 PL 96 PL 144 70 mm 106 mm 142 mm 230mm
Scale Interchangeability	:	Interchangeable.

Mechanical Data

Case details	:	Moulded square case suitable for mounting in Control / Switchgear panels. Machinery consoles.
Case material	:	Glass filled polycarbonate, flame retardant and drip proof as per UL 94 V-0.
Front facia	:	Glass
Colour of bezel	:	Black
Position of use	:	Vertical
Panel fixing	:	Swivel Screws
Mounting	:	Stackable in single cut out
Panel thickness	:	≤ 25 mm
Terminals	:	
Voltmeters and ammeters < 6A	:	Hexagon studs, M4 screws And wire clamps E3(DIN 46282)

Ammeters <6A
Ammeters > 60A

Threaded studs M6 with nuts
Threaded studs M8 with nuts

Electrical Data

Measured quantity	:	DC voltage or current (acc to IS : 1248/ IEC 51)
Overload capacity	:	1.2 times rated voltage/ Current
Continuously	:	
Short duration	:	
Voltmeters	:	2 times for 5 sec : 1 overload 2 times for 0.5 sec : 9 overloads
Ammeters	:	10 times for 5 sec : 1 overload 10 times for 0.5 sec : 9 overloads
Enclosures code (IEC 529)	:	IP 52 case IP 00 for terminals without back - cover IP 20 for terminals with backcover
Insulation class	:	Group A according to VDE 0110 PL48 PL 72/96/144
Rated insulation voltage	:	660V 1000V
Proof voltage	:	2kV 3kV
installation category	:	300V CAT III 660V CAT III
Insulation resistance	:	> 50 Mohm at 500 V d.c.

Accuracy at Reference Conditions

Accuracy class	:	1.5 according to IS:1248 (IEC 51/ DIN EN 60051)
Reference conditions	:	
Ambient temperature	:	23°C ± 2°C
Position of use	:	Nominal position ± 1°
Input	:	Rated value of measured quantity
Other conditions	:	IS : 1248 (IEC 51/DIN EN 60051)
Nominal range of use	:	
Ambient temperature	:	0 ... 50° C
Position of use	:	Vertical ± 5°
External magnetic field	:	At 0.4 kA/m

Environmental Conditions

Climatic suitability	:	Climate category II as per IS : 1248(climatic class 3 according to VDE/VDI 3540)
Operating temperature	:	-10... + 55°C
Storage temperature	:	-25... + 65°C
Relative humidity	:	≤75% annual average, non condensing
Shock resistance	:	15g. 11 ms
Vibration resistance	:	10-55-10Hz / 0.15mm 1.5 g at about 50 Hz.

Options

Case	:	
Front facia	:	Antiglare glass
Colour of bezel	:	Red, Yellow, Blue, White
Red index pointer	:	Front adjustable on site
Position of use	:	on request 0° 180°



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Dial
Blank dial : With initial & end values marked.
Special markings : Numbering /Lettering.
Division dials : Basic divisions without numbering.
Colour markings/bands : Red or green.

Others

Zero position : Center zero or off-set zero
Increased sensitivity : 4kohm/V for voltmeters 1...600V
10 kohm/V for Voltmeters
15..150V
Adjustment of Resistance : Within $\pm 1\%$ at 23°C
(Sensitivity)

Standard Measuring Ranges

D. C. Current		D. C. Voltage	
Rated Value	Approx Voltage drop	Rated Value	Sensitivity ($\pm 10\%$)
50 μA ^{*4}	540 mV	60 mV ^{*7}	200 ohm/V
60 μA ^{*4}	540 mV	75 mV ^{*7}	200 ohm/V
75 mA	540 mV	100 mV ^{*7}	200 ohm/V
100 μA ^{*7}	970 mV	150 mV ^{*7}	200 ohm/V
150 μA	970 mV	250 mV ^{*7}	200 ohm/V
250 μA	810 mV	400 mV ^{*7}	1 kohm/V
400 μA	900 mV	600 mV ^{*7}	1 kohm/V
600 μA	900 mV	750 mV ^{*7}	1 kohm/V
1 mA ^{*7}	500 mV	1 V ^{*7}	1 kohm/V
1.5 mA	500 mV	1.5 V ^{*7}	1 kohm/V
2.5 mA	500 mV	2.5 V ^{*7}	1 kohm/V
4 mA	500 mV	4 V ^{*7}	1 kohm/V
5 mA ^{*7}	40 mV	6 V ^{*7}	1 kohm/V
6 mA	40 mV	10 V ^{*7}	1 kohm/V
10 mA	75 mV	15 V ^{*7}	1 kohm/V
15 mA	60 mV	25 V ^{*7}	1 kohm/V
20 mA	60 mV	30 V ^{*7}	1 kohm/V
25 mA	60 mV	40 V ^{*7}	1 kohm/V
40 mA	60 mV	60 V ^{*7}	1 kohm/V
60 mA	60 mV	100 V ^{*7}	1 kohm/V
100 mA	60 mV	150 V ^{*7,8}	1 kohm/V
150 mA	60 mV	200 V ^{*7,8}	1 kohm/V
200 mA	60 mV	250 V ^{*7,8}	1 kohm/V
250 mA	60 mV	300 V ^{*7,8}	1 kohm/V
300 mA	60 mV	400 V ^{*7,8}	1 kohm/V
400 mA	60 mV	500 V ^{*7,8}	1 kohm/V
500 mA	60 mV	600 V ^{*7,8}	1 kohm/V
600 mA	60 mV		
750 mA	60 mV		
1 A ^{*8}	60 mV		
1.5 A ^{*8}	60 mV		
2.5 A ^{*8}	60 mV		
4 A ^{*8}	60 mV		
5 A ^{*8}	60 mV		
6 A ^{*8}	60 mV		
10 A ^{*8}	60 mV		
15 A ^{*8}	60 mV		
20 A ^{*8}	60 mV		
25 A ^{*8}	60 mV		
30 A ^{*8}	60 mV		
40 A ^{*5}	60 mV		
60 A ^{*5}	60 mV		

^{*4} Accuracy class 2.5
^{*5} Not applicable for PL 72
^{*6} Total lead resistance of 0.035 ohm is considered for mV ranges while calibration.
^{*7} Applicable for PL 48
^{*8} Possible in 72 and above size

Applicable Standards

Nominal case and cutout dimensions for indicating measuring instruments. : IS 2419
DIN 43700

Scale and pointer for electrical measuring instruments : IS 1248, IEC 51
DIN 43802

Connections and Terminal markings for panel meters : IS 1248, IEC 51
DIN 43807

Terminal bolts / leads : DIN 46200/46282

Clamp straps for connections. : DIN 46282

Safety requirements and protective measures for Electrical indicating instruments and their accessories. : IS 9249
DIN 40050 / 8-70
VDE 0110 /11-72
VDE 0410 /10-76
IEC 529,IEC 1010

Performance specifications for direct acting indicating analogue electrical measuring instruments & their accessories: : IS 1248, IEC 51
IEC 51/DIN EN
60051DIN 43701

Environmental conditions : IS 1248, IEC 51
IS: 9000, Part 5, 7,
8,VDE / VDI 3540

Front frames for indicating measuring instruments principle dimensions. : DIN 43718

UL Combustibility class. : UL 94 V-O

Technical conditions of delivery for electrical instruments. : DIN 43701

Mechanical strength (Free fall test, vibration test) : IS 1248, IEC 51
IS 9000
VDE 0411, part I,
Sec.43/44.IEC
1010

Comply with following European directives : 89 / 336/ EEC
(EMC directive), 73 / 23 / EEC (low voltage directive) &
amendment 93 / 68 / EEC, for CE marking.



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Safety Precautions

- Instruments with damaged bezels or window glasses must be disconnected from mains.
- Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housing, if non - insulated connector wires are used.
- The back cover must be snapped into place after the connector wires have been clamped for protection against accidental contact.
- Scales should be replaced under Voltage - free conditions.
- Bezels and window glasses should be replaced under Voltage free conditions

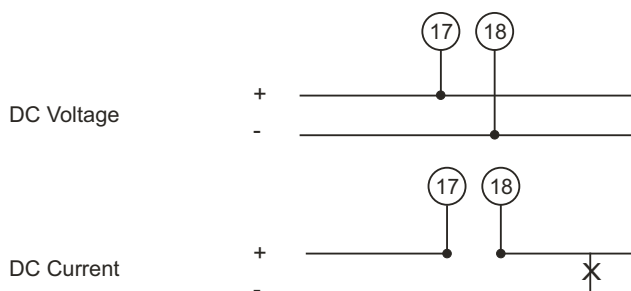
Specifications are subject to change without notice(02/09)

Accessories

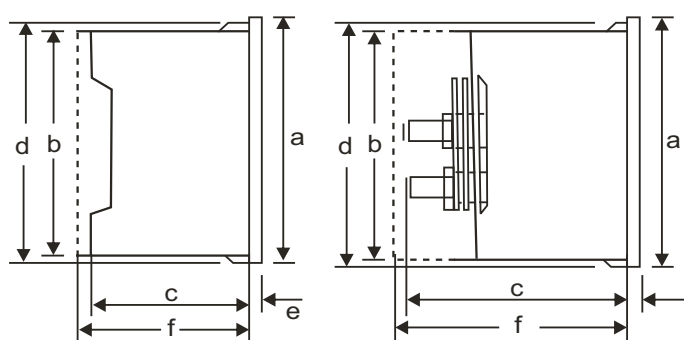
Safety Terminal protection

Full sized polycarbonate back cover to provide protection against accidental contact (hand and fingers) acc. to IS 9249, VDE 0410.

Connections



Dimensions



Dimensions (in mm)		PL48	PL72	PL96	PL144
Bezel	a	□ 48	□ 72	□ 96	□ 144
	b	□ 43.5	□ 66	□ 90	□ 136
Case	c*	□ 53	□ 53	□ 53	□ 53
	d	□ 44.5	□ 67.5	□ 91.5	□ 137.5
	e	5.5	5.5	5.5	5.5
	Depth	□ 45 ^{+0.6}	□ 68 ^{+0.7}	□ 92 ^{+0.8}	□ 138 ⁺¹
Cutout Size		□ 45 ^{+0.6}	□ 68 ^{+0.7}	□ 92 ^{+0.8}	□ 138 ⁺¹
Weight (approx.)		0.13 kg.	0.25 kg.	0.30 kg.	0.43 kg.
Depth with Back cover		f **	64	64	64

* c = 68mm, for I= 6 to 60 A

* c = 78mm, for I> 60 A

** f = 70mm, for I= 6 to 60 A



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Ordering Information

Type : PL	Moving-coil panel meter 240° scale
Front dimension : 48 96 72 144	48 mm x 48 mm 96 mm x 96 mm 72 mm x 72 mm 144 mm x 144 mm
Measuring ranges	refer to table inside
Front facia	Normal glass ^{*1} , PC glass ^{*3} Antiglare glass ^{*3}
Colour of bezel	Black ^{*1} Red, Blue, Yellow, White ^{*3}
Position of use	Vertical ^{*1} on request 0....180° ^{*3}
Terminal protection	Full sized polycarbonate back cover
Zero position	Centre ^{*1} , Off-set zero ^{*3}
Increased sensitivity	4 kohm/V for voltmeters 1...600 V ^{*3} 10 kohm/V for voltmeters 15...150 V ^{*3}
Adjustment Resistance (Sensitivity)	Within $\pm 1\%$ at 23°C ^{*3}
Dial	Standard scale same as measuring range ^{*3} Blank dial with division ^{*3} Additional lettering on request ^{*3} Additional numbering on request ^{*3} Coloured marking red or green ^{*3} Coloured sector red or green ^{*3}
Logo	RISHABH ^{*1} , Others ^{*3}

^{*1} standard

^{*3} Please clearly add the desired specifications while ordering

Ordering example

PL 72 measuring range 0 ... 20 mA, dial with 0...100°C, red mark at 37°C

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Specifications may change without prior notice



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